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05739

LORAIN

Products Corporation

LORAIN MODEL RB3L

DC TO DC CONVERTER

Spec. No. 5686-004 Serial No. 963

RB3L instructions

INSTALLATION

OPERATION

MAINTENANCE

DESIGNERS AND MANUFACTURERS OF

power equipment without moving parts SUB-CYCLE® CONVERTERS AND FLOTROL® RECTIFIERS

FOR PARTS OR SERVICE
CONTACT LORAIN SERVICE

1313 "G" STREET
LORAIN, OHIO 44052
PH: (216) 288-1122 EXT 255
(216) 288-1166
TWX: 810-426-2130

BUILDING 4, SUITE 119
3001 REDHILL AVENUE
COSTA MESA, CALIF. 92626
PH: (714) 540-4395

722 NORTH GREAT SOUTHWEST PARKWAY
ARLINGTON, TEXAS 76011
PH: (817) 640-1134

6270 McDONOUGH DR.
SUITE C
NORCROSS GA. 30093
PH: (404) 449-0840

245 ROOSEVELT RD.
BUILDING 2, UNIT 13
WEST CHICAGO, ILLINOIS 60185
PH: (312) 231-5775

LORAIN MODEL RB3L

DC TO DC CONVERTER

Spec. No. 5686-004 Serial No. 963

LORAIN PRODUCTS CORPORATION WARRANTY

Seller warrants that the products it manufactures or sells shall be free from defects in material and workmanship during the first 90 days after the product is activated. During said period, Seller will repair or replace any defective parts free of charge to Buyer, including any labor costs. In addition, Seller shall repair or replace any defective parts, so discovered by Buyer to be defective within two years from the date of shipment of same, provided Buyer promptly so notifies Seller. In no case shall Seller's liability under this warranty extend beyond two years from the date of shipment of said product. This warranty shall not apply to any products which are misused, modified, repaired, or otherwise abused by Buyer or others. The repair or replacement of defective parts, or the refund of the invoice cost thereof, as shall be determined by Seller in its sole discretion, shall be the limit of Seller's liability hereunder and shall be Buyer's sole and exclusive remedy.

Handling or service charges in connection with the return of such products, if approved by Seller, shall be charged as determined by Seller. Seller shall not be liable in any event for any general or special, incidental or consequential damages to Buyer in excess of the amount of the purchase price of the product.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES. SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE WITH RESPECT TO ANY PRODUCTS EXCEPT AS HEREIN EXPRESSLY PROVIDED.

Systems and Equipment Not Economically Returnable To The Factory

In the event that the product involved is a system or equipment which, in the judgment of Lorain Products Corporation, is not economically returnable to the factory or if Lorain Products Corporation has performed the installation, supervised the installation, or performed testing and turn-on, circuit components and Lorain repair labor are covered by this warranty for the first 90 days from date of turn-on and circuit components are warranted for two years from the date of shipment. Upon request, Lorain will send a service technician to the site to determine if the unit is defective in circuit components or workmanship, and will repair the equipment. If the failure is Lorain's fault, no invoice for circuit components or repair labor will be issued if the complaint has been issued within the first 90 days from date of turn-on. If the complaint is issued more than 90 days from the date of turn-on but within two years from the date of shipment, the customer will be billed at the prevailing Customer Service rates but will not be billed for circuit components. If the problem occurs after two years from the date of shipment, circuit components and repair labor are billable.

If the problem has been created by misuse or abuse of the equipment or by malfunction of associated equipment or by environmental conditions, at any time after shipment, the customer will be billed for circuit components and labor.

General Provisions

Lorain Products Corporation shall not be obligated to pay any costs or charges incurred by the customer or by any other party. In no event will Lorain Products Corporation be liable for consequential damages. No waiver, alteration or modification of any of the provisions herein shall be binding on Lorain Products Corporation unless in writing and signed by an authorized official of Lorain Products Corporation. If, during any warranty period, the subject equipment has, in the opinion of Lorain Products Corporation, been modified or misrepaired, the warranty will be void unless the modifications or repairs have been made after consultation with the corporation and upon the recommendation of the corporation.

INSTRUCTIONS
LORAIN MODEL RB3L D-C TO D-C CONVERTER
SD-5686-004

TABLE OF CONTENTS

		Page
1.	RATINGS	1
2.	DESCRIPTION	1
3.	INSTALLATION	
	a. Mounting	1
	b. Electrical Connections	2
4.	OPERATION	
	a. Starting and Stopping	2
	b. Fuses	3
	c. Output Failure	3
5.	CIRCUIT DESCRIPTION	
	a. D-c Input Circuit	3
	b. Oscillator	3
	c. Power Rectifier, Output Circuit	4

INSTRUCTIONS
LORAIN MODEL RB3L D-C TO D-C CONVERTER
SD-5686-004

1. RATINGS

Input: 44 to 56 volt d-c; 13 ampere
Filtering: Less than 30 DBRN with "C" message weighting and connected to a 240 AH lead-acid battery and measured with a W. E. 3A Test Set.

Output: Two 140 volt d-c outputs; 1.5 ampere each output
Filtering: Less than 34 DBRN with "C" message weighting and measured with a W. E. 3A Test Set.
Regulation: 6-1/2% from no load to full load at 50 volt d-c input. Not regulated with respect to input voltage.

2. DESCRIPTION

LORAIN Model RB3L D-c to D-c Converter can be connected to furnish both positive and negative output power for the operation of coin collect and return magnets in telephone paystation systems. It has separate positive and negative output terminals, and one output terminal common to both positive and negative output circuits.

This D-c to D-c Converter operates from 48 volt office battery so that it will continue to function despite a-c power failure. Since it has no moving parts, it requires no periodic maintenance or adjustment. A remote control relay permits this D-c to D-c Converter to be operated from a remote location.

Two LORAIN Model RB3L D-c to D-c Converters can be operated in parallel to provide a standby power source in the event one of the Converters should fail. If output failure should occur in either parallel connected unit, a diode connected in series with its output isolates the failed unit from the paralleled unit.

In event of d-c output failure, an alarm lamp lights and, if connected, an external alarm is given.

3. INSTALLATION

a. Mounting

Model RB3L D-c to D-c Converter can be mounted in a 19 inch relay rack. It requires 8-3/4 inches panel space, extends 5 inches to front of rack, and has overall depth of 13-7/8 inches.

CAUTION: In mounted position, vent openings at top and bottom of D-c to D-c Converter must be unobstructed. This is essential for proper cooling during operation. The temperature of the air surrounding the cabinet should not exceed 50°C (122°F).

b. Electrical Connections

To gain access to installer connection terminals, release two twist-type fasteners and remove rear cover from D-c to D-c Converter. Electrical lead entrance is by an insulator bushing at right hand rear of cabinet as viewed from front of D-c to D-c Converter.

(1) Connect signalling d-c load at OUTPUT terminals 3 (positive), 4 (common), and 5 (negative).

(2) Supply 48 volt battery at INPUT terminals 1 (negative) and 2 (positive).

(3) Connect a "remote start" lead (on which ground is to be furnished) to terminal 13 of terminal strip TB1.

CAUTION: D-c input voltage is critical. If input voltage should increase to excessive value, even during an instantaneous peak, damage to transistors may result. For this reason, do not connect a filter between 48 volt battery and D-c to D-c Converter input.

NOTE: A jumper connects positive d-c input to chassis ground to protect transistors in the oscillator circuit against incorrect input polarity. If desired, this jumper can be disconnected and removed after proper input connections have been made.

(4) Connect negative 48 volt battery to terminal 12 of terminal strip TB1 to operate the output failure lamp.

(5) In event of d-c output failure, ALARM terminals 6 and 7 furnish ground while terminals 8 to 9 and terminals 10 to 11 each supply a closed loop, to give an external alarm. Closed-loop alarm terminals of two parallel-connected units can be connected in series to give a major alarm.

4. OPERATION

a. Starting and Stopping

Circuit breaker CB1 protects the input circuit and serves as an "on-off" switch. In order to turn the D-c to D-c Converter on, however, ground must be furnished at the remote start terminal 13 on TB1. Also, when remote starting is to be used, circuit breaker CB1 must be left in its "on" position. With the circuit breaker turned on, a remote control device furnishing ground on the remote start terminal will turn the D-c to D-c Converter on.

4. b. Fuses

Fuse F1 protects the d-c input circuit; fuses F2 and F3 protect the output circuit. If necessary to replace any of these fuses, replace fuse F1 with Bussmann Type BAF, 25 ampere, or equivalent; replace fuses F2 and F3 with Bussmann Type MTH, 4 ampere, or equivalent.

c. Output Failure

If output failure should occur in the D-c to D-c Converter, it is indicated by an external alarm (if connected) and by an alarm lamp on front panel of the D-c to D-c Converter.

5. CIRCUIT DESCRIPTION

a. D-c Input Circuit

Fuse F1 and circuit breaker CB1 protect the input circuit. Fuse F1 or circuit breaker CB1 will open to protect the oscillator described below, in event of extreme overload.

Input choke L1 and capacitor C5 form a filter which prevents noise from the D-c to D-c Converter from reaching input battery. Diode CR5, connected across L1, clips any reverse voltage peaks generated in L1 which might damage the oscillator circuit.

b. Oscillator

Transistors Q1A, B, C through Q4A, B, C make up the oscillator circuit. Each transistor group is composed of three transistors connected in parallel. These transistor groups conduct in pairs; when transistor groups composed of transistors Q1A, B, C, and Q3A, B, C conduct, transistor groups composed of transistors Q2A, B, C and Q4A, B, C are at cutoff and vice-versa.

Switching of the transistor groups is controlled by the saturating of transformer T1. Each time transformer T1 saturates, a large primary current results which causes a voltage drop across the transistors which are conducting, dropping the voltages across T1, initiating a reversal. This results in a square wave of voltage across the primary of T2.

Resistors R1 through R4 limit base current in the oscillator transistors. Capacitors C1 through C4 furnish low-impedance paths to drive current transients to improve switching characteristics.

6. c. Power Rectifier, Output Circuit

Transformer T2 supplies a-c to two full-wave center-tap rectifiers which furnish d-c output. Diodes CR1 and CR3 furnish d-c to negative d-c load; diodes CR2 and CR4 furnish d-c to positive d-c load. Common d-c output is connected at a T2 secondary center-tap so that, by autotransformer action, it is always held half way between positive and negative output potential.

Resistance capacitance network R11-C12 protects diodes CR1, CR2, CR3, and CR4 against overvoltage spikes.

Two choke-input filters are used in the output circuit to smooth a-c ripple from rectifier output so that D-c to D-c Converter output will more nearly approach pure d-c. Diodes CR6 and CR7 conduct to permit flow of output current from this unit, but in event of d-c output failure, block to prevent flow of output current from a parallel-connected unit.

D-c output is connected to series resistor R10 and coil of relay K1 to operate relay K1. In event of d-c output failure, relay K1 releases. Contacts of relay K1, released, supply ground at terminals 6 and 7 and short circuit terminals 8 to 9 and terminals 10 to 11 to give an external alarm.

LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

July 14, 1975

ELECTRICAL PARTS LIST
LORAIN MODEL RB3L DC TO DC CONVERTER
SPEC. NO. 5686-004

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
ASSEMBLIES			
	4732-002	Heat Sink	**
	4784-001	Heat Sink	**
	4872-401	Trans and Heat Sink	**
CAPACITORS			
C5	2731-238	1600UF 80 Volt, Electrolytic	-
C7	2715-272	1UF 200 Volt	1
C8	2731-637	75UF 300 Volt, Electrolytic	-
C9	2731-637	75UF 300 Volt, Electrolytic	-
C10	2731-713	850UF 200 Volt, Electrolytic	-
C11	2731-713	850UF 200 Volt, Electrolytic	-
CIRCUIT BREAKERS			
CB1	2566-107	20 Amp 50 Volt DC	1
FUSES			
F1	2483-442	Cartridge Laminated	3
F2	2483-236	4 Amp, Cartridge	4
F3	2483-236	4 Amp, Cartridge	*
INDICATOR LAMPS			
OF	2581-213	48 Volt, Filament	1

ELECTRICAL PARTS LIST
LORAIN MODEL RB3L DC TO DC CONVERTER
SPEC. NO. 5686-004

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
CONTACTORS			
K2	2561-015	50 Volt 50 Amp	1
INDUCTORS			
L1	4413-505	Filter Choke	-
L2	4415-508	Filter Choke	-
L3	4415-508	Filter Choke	-
L4	4415-508	Filter Choke	-
L5	4415-508	Filter Choke	-
RELAYS			
K1	2542-911	130 Volt Telephone	1
RESISTORS			
R7	2656-506	10 Ohm 25 Watt, Fixed	1
R8	2656-616	800 Ohm 50 Watt, Fixed	1
R9	2656-616	800 Ohm 50 Watt, Fixed	*
R10	2651-758	17.5K Ohm 5 Watt, Fixed	1
TRANSFORMERS			
T1	4513-002		-
T2	4511-612	Power	-
MISCELLANEOUS			
	2488-106	Fuseholder	1
	2488-210	Fuse Block	1
	2584-113	Lampholder	1
	2584-636	Cap, Lens, Red	1

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Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

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ELECTRICAL PARTS LIST
LORAIN 4732-002 HEAT SINK ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
CAPACITORS			
C12	2713-429	0.01UF 600 Volt	1
DIODES			
CR1	2813-154	1N1205RA, Silicon	2
CR2	2813-153	1N1205A, Silicon	2
CR3	2813-154	1N1205RA, Silicon	*
CR4	2813-153	1N1205A, Silicon	*
RESISTORS			
R11	2651-322	200 Ohm 3 Watt, Fixed	1

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ELECTRICAL PARTS LIST
LORAIN 4784-001 HEAT SINK ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part, assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
DIODES			
CR5	2813-133	1N1200A, Silicon	1
CR6	2813-144	1N1202A, Silicon	2
CR7	2813-144	1N1202A, Silicon	*

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ELECTRICAL PARTS LIST
LORAIN 4872-401 TRANSISTOR AND HEAT SINK ASSEMBLY

This Electrical Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN EQUIPMENT is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. The quantity of spare parts listed should be sufficient for ten or less assemblies or models for at least 18 months. If a single asterisk (*) appears in the Quantity Recm. Spares column, it indicates the part; assembly, or model is listed more than once, in which case, use the quantity where the item first appears. If two asterisks (**) appear, refer to the sub-list for that assembly or model. If a dash (-) appears, this indicates that spares are not recommended for this part or assembly.

Ref. Desig.	LPC Part No.	Description	Quantity Recm. Spares
CAPACITORS			
C1	2715-282	2UF 200 Volt	1
C2	2715-282	2UF 200 Volt	*
C3	2715-282	2UF 200 Volt	*
C4	2715-282	2UF 200 Volt	*
RESISTORS			
R1	2652-302	1 Ohm 10 Watt, Fixed	1
R2	2652-302	1 Ohm 10 Watt, Fixed	*
R3	2652-302	1 Ohm 10 Watt, Fixed	*
R4	2652-302	1 Ohm 10 Watt, Fixed	*
R5	2652-325	300 Ohm 10 Watt, Fixed	1
R6	2651-735	1K Ohm 5 Watt, Fixed	1
TRANSISTORS			
Q1A	2848-150	15 Amp, PNP	6
Q1B	2848-150	15 Amp, PNP	*
Q1C	2848-150	15 Amp, PNP	*
Q2A	2848-150	15 Amp, PNP	*
Q2B	2848-150	15 Amp, PNP	*
Q2C	2848-150	15 Amp, PNP	*
Q3A	2848-150	15 Amp, PNP	*
Q3B	2848-150	15 Amp, PNP	*
Q3C	2848-150	15 Amp, PNP	*
Q4A	2848-150	15 Amp, PNP	*
Q4B	2848-150	15 Amp, PNP	*
Q4C	2848-150	15 Amp, PNP	*

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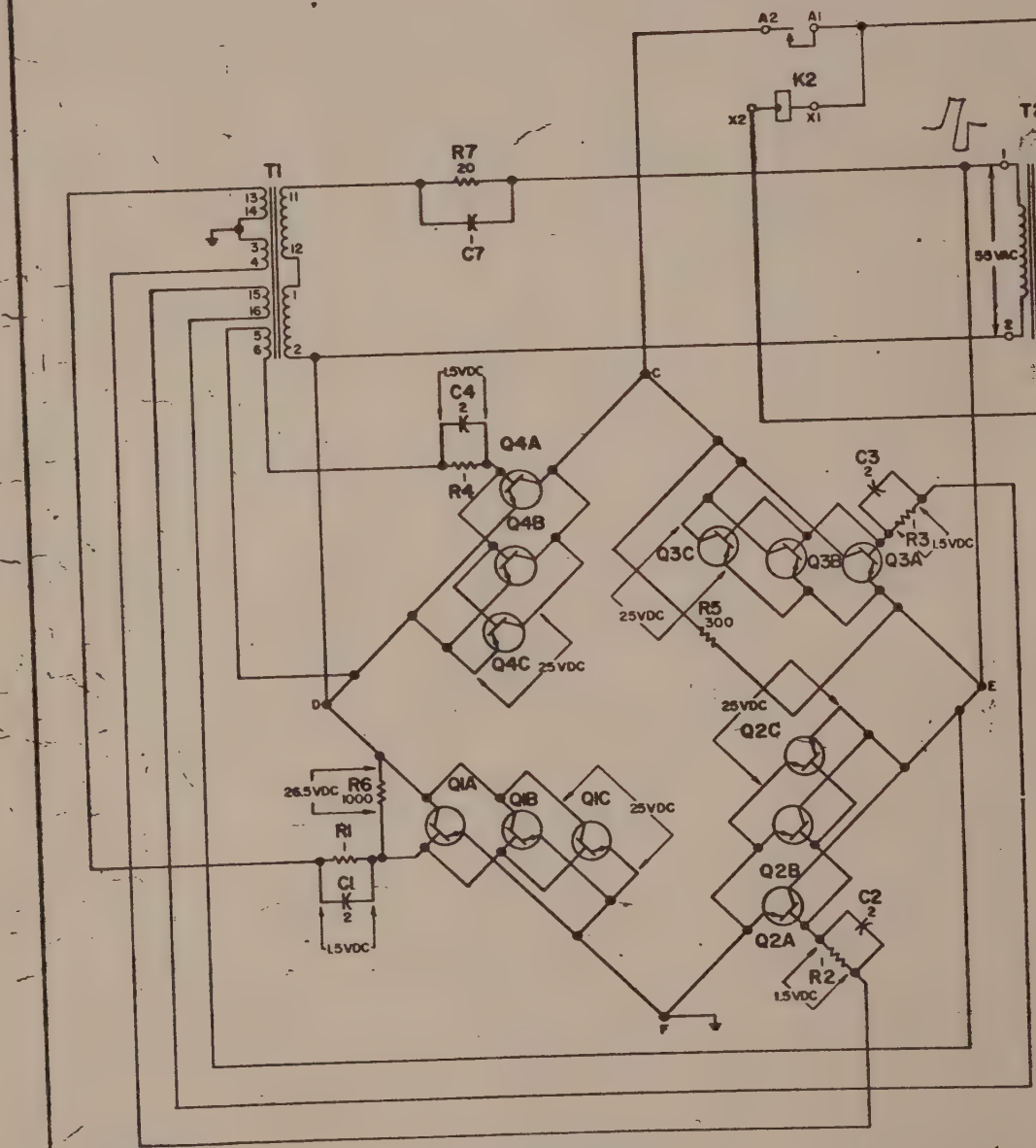


EQUIPMENT NOTES

201 CONNECT INPUT TO BATTERY SIDE OF FILTER IN PLANT HAVING DISCHARGE FILTER IN SERIES WITH LOAD; FUSE INPUT AT 30 AMPERES.

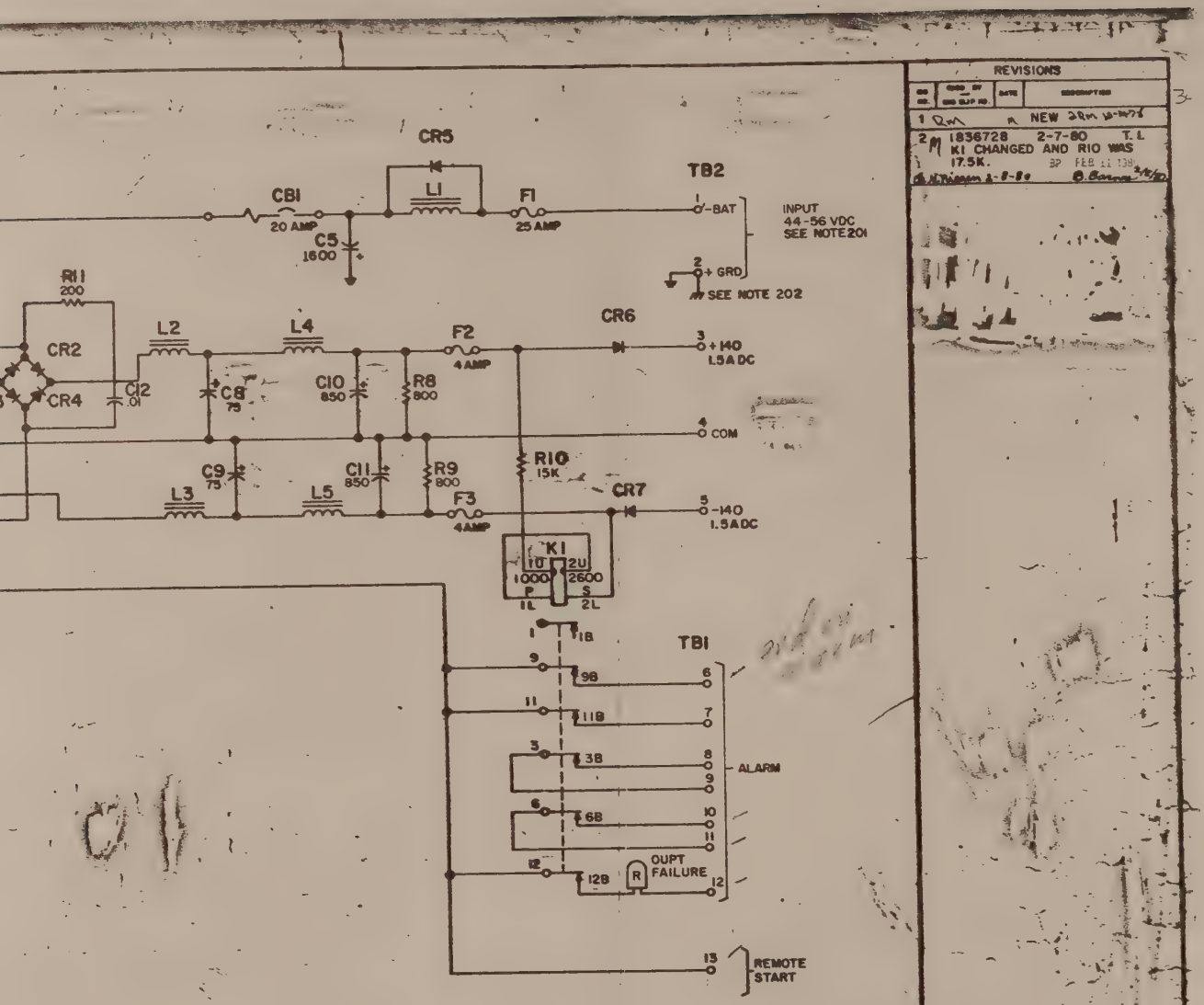
202 FRAME GROUND TO CHASSIS PROVIDED BY JUMPER, REMOVAL OPTIONAL AFTER INSTALLATION AND TESTING

INFORMATION NOTES

301 UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES IN MICROFARADS

302 TEST VOLTAGES: AC VOLTAGE MEASUED WITH 5000 OHM/VOLT, RECTIFIER TYPE AC VOLTMETER THROUGH 0.1 UF DC BLOCKING CAPACIATOR. DC VOLTAGE MEASURED WITH 20,000 OHM/VOLT DC VOLTMETER. ALL READINGS ACCURATE WITHIN ± 5% AT NOMINAL INPUT VOLTAGE AND NO LOAD OUTPUT

303 RELAYS SHOWN IN NON-OPERATED CONDITION



REVISIONS			
NO.	ECO OR ECP NO.	DATE	DESCRIPTION
1	QM	A	NEW 28M 12-19-78
2	M 1836728	2-7-80	T. L. K1 CHANGED AND R10 WAS 17.5K. BP FEB 11 1980

SCHEMATIC DIAGRAM
FOR
MODEL RB3L
SPEC 5686-004

DRAWN BY	S. MATTY	DATE 11-21-69
CHECKED BY		DATE 12-1-69
APPROVED BY		DATE 12-12-69
APPROVED BY		DATE 12-12-69
ISSUE	2	
REF. NO.	FD1040JC	
	SD-5686-004	
DWG SIZE	D	SHEET 1 OF 1

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LORAIN, OHIO
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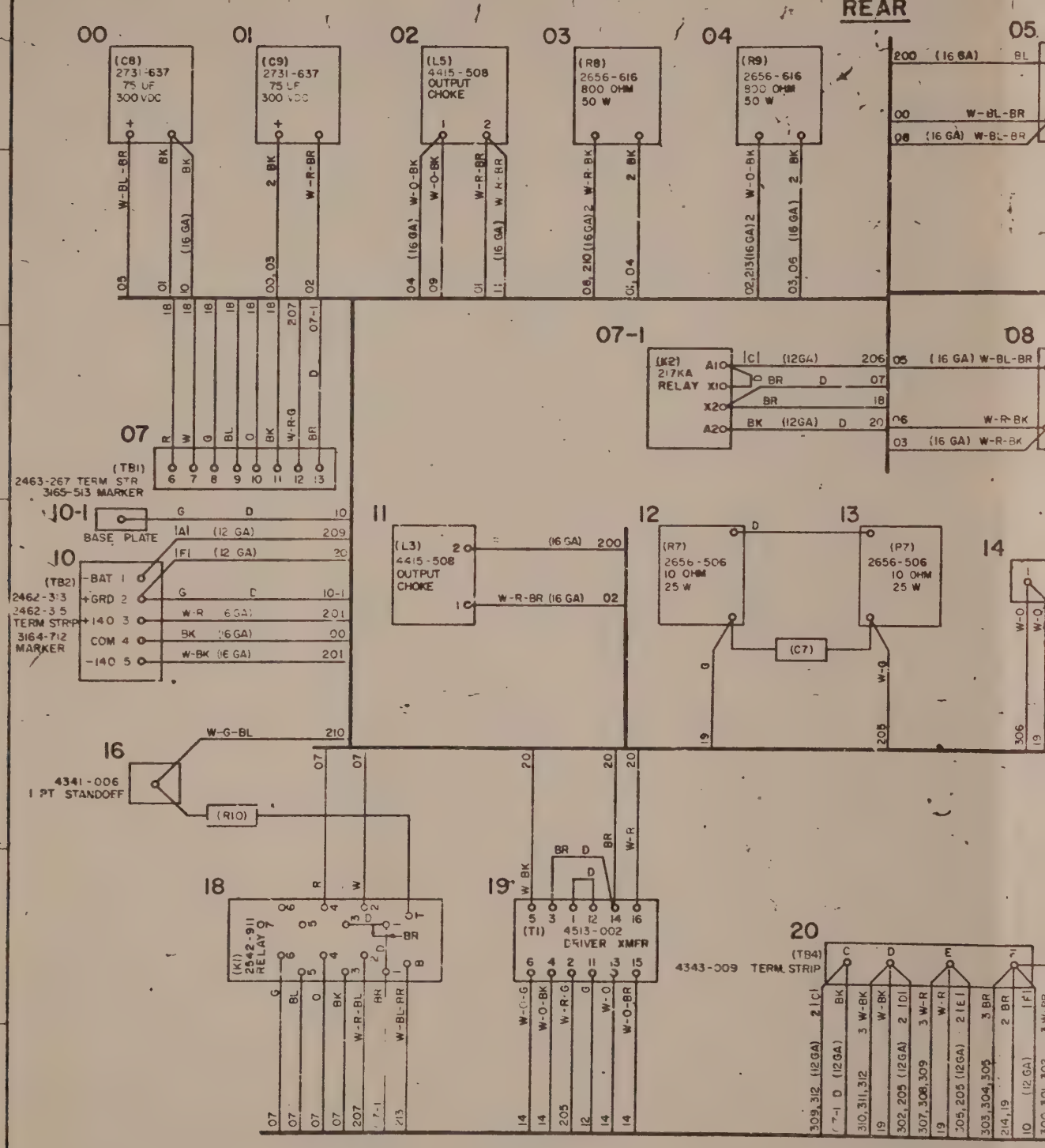
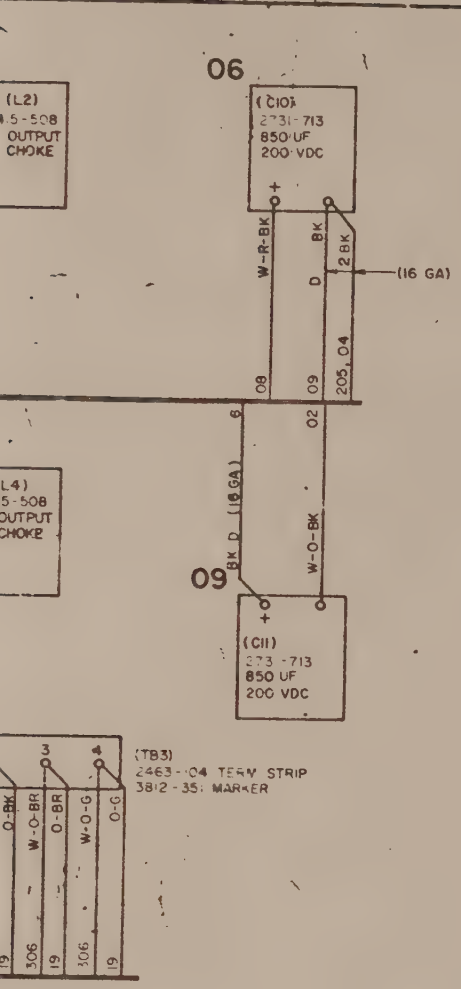


PIGTAIL COMPONENT INFORMATION					
REF DESIG	LRC PT. NO.	IN & ZN NO'S	VALUE	RATING	LOC
C7	2715-272		1	200 VDC	12
R10	2651-758		17,500	5W	16

MFG NOTES

1. UNLESS OTHERWISE 20 GA STRANDED,
2. D INDICATES LEAD
3. PT INDICATES LEAD
4. BB INDICATES LEAD
5. MOUNTED WITHOUT SINKS WHICH ARE
6. UNLESS OTHERWISE OHMS, CAPACITANCE



REVISION NOTES

ISS 2 DESIGNATIONS C8 AND C9 REVISED LOCATIONS 100 AND 101

ISS 3: WIRING CORRECTION AT LOC. 104, 106 AND 109

2	1831334	11-19-71		
3	1834765	11-19-74		

FIED, ALL WIRES ARE
PT NO 1543-200 SERIES
PER (ALL BK #6 GA STRD)
PPLIED AS PART OF APPARATUS
S BAR
ATORS ON INDIVIDUAL HEAT
TED FROM GROUND
IED, RESISTANCE VALUES ARE
UES ARE IN MICROFARADS.

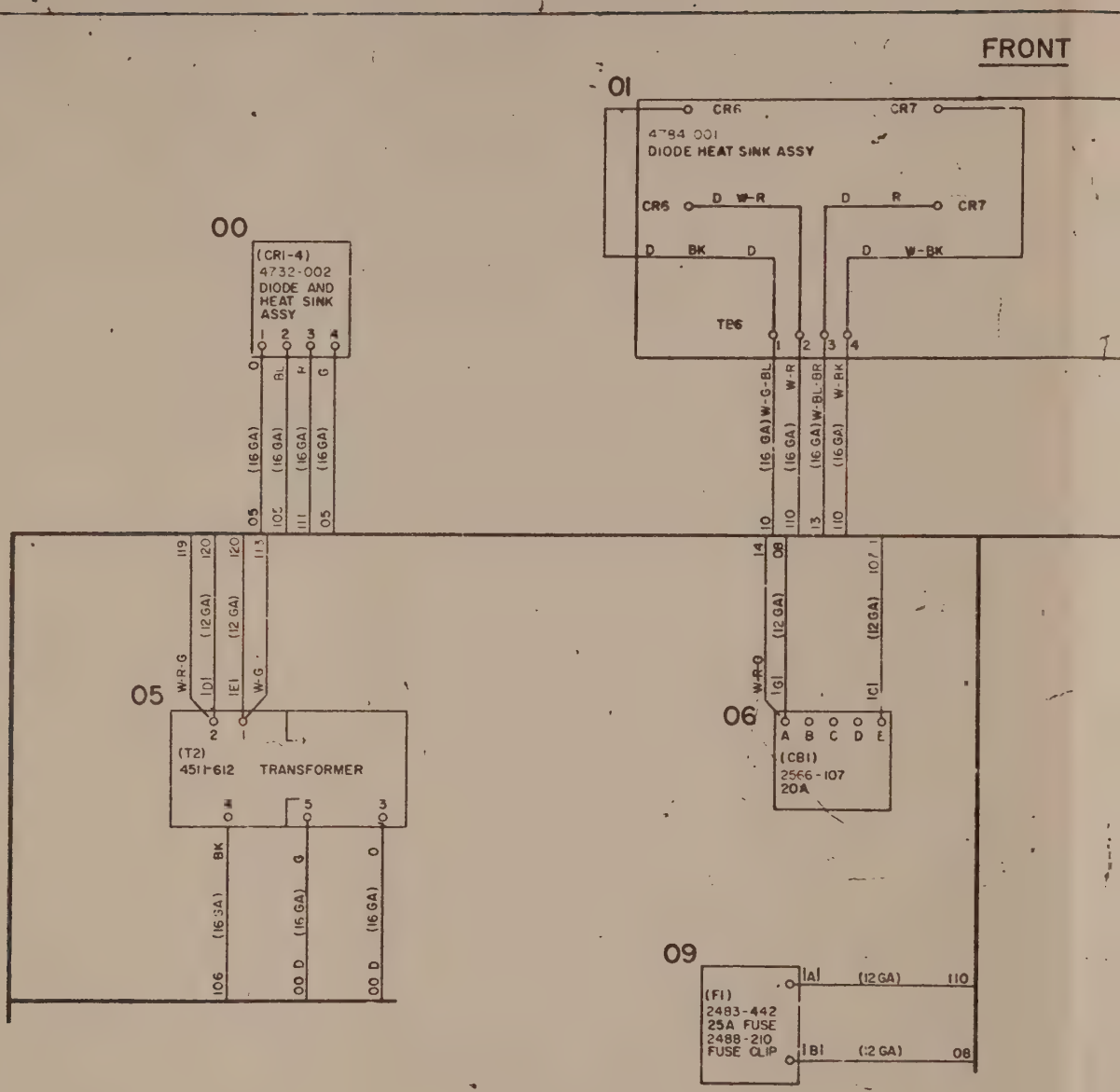
DESIGN BY P. Paradiso

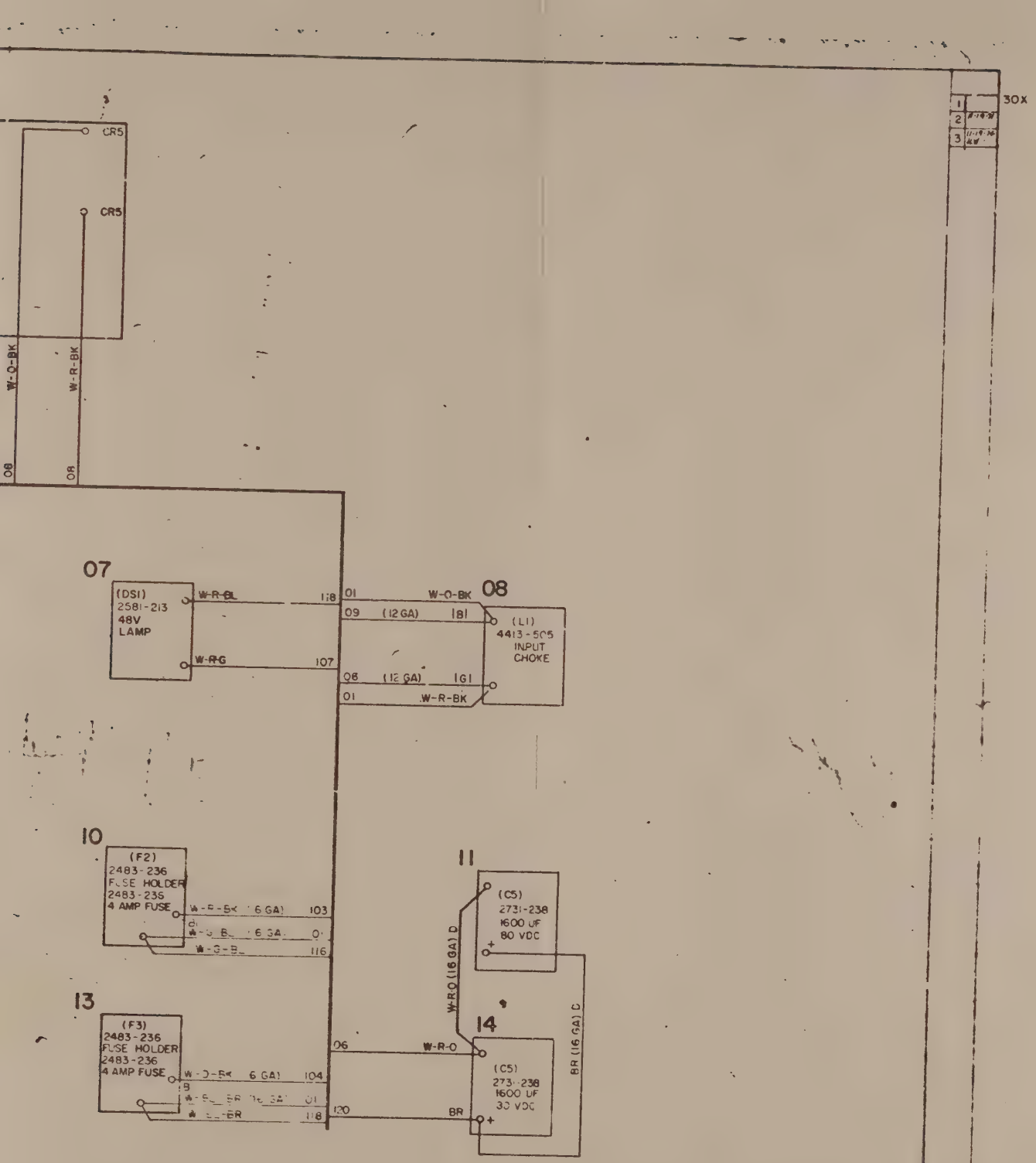
REPRO

WIRING DIAGRAM
FOR
MODEL RB3L

T-5686-004

D

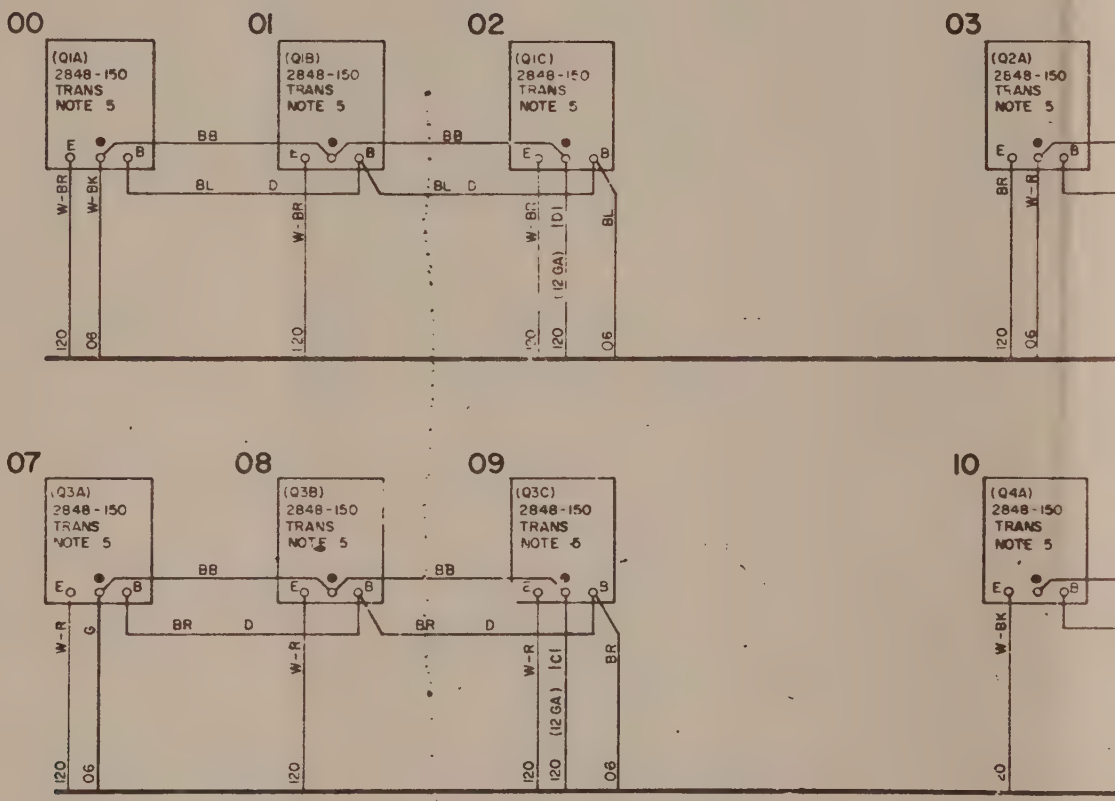

FRONT
01
CR6
CR7
4784 001
DIODE HEAT SINK ASSY
CR6
D W-R
D R
CR7
D BK D
D W-BK
TB6
1 2 3 4
00
(CR1-4)
4732-002
DIODE AND
HEAT SINK
ASSY
1 2 3 4
(16 GA) BL (16 GA) P (16 GA) G (16 GA)
05 10C 111 05
(16 GA) W-G-BL (16 GA) W-R (16 GA) W-BL-BR (16 GA) W-BK (16 GA)
10 110 13 110
119 120 120 113
W-R-G (12 GA) (12 GA) W-G
101 1E1
05
(T2)
451F612 TRANSFORMER
2 1
4 5 3
BK (16 GA) G (16 GA) O (16 GA)
106 00 D 00 D
14 08
(12 GA) (12 GA)
W-R-O
161 1C1
06
A B C D E
(CB1)
2566-107
20A
09
(F1)
2483-442
25A FUSE
2488-210
FUSE CLIP
1A (12 GA) 110
1B (12 GA) 08

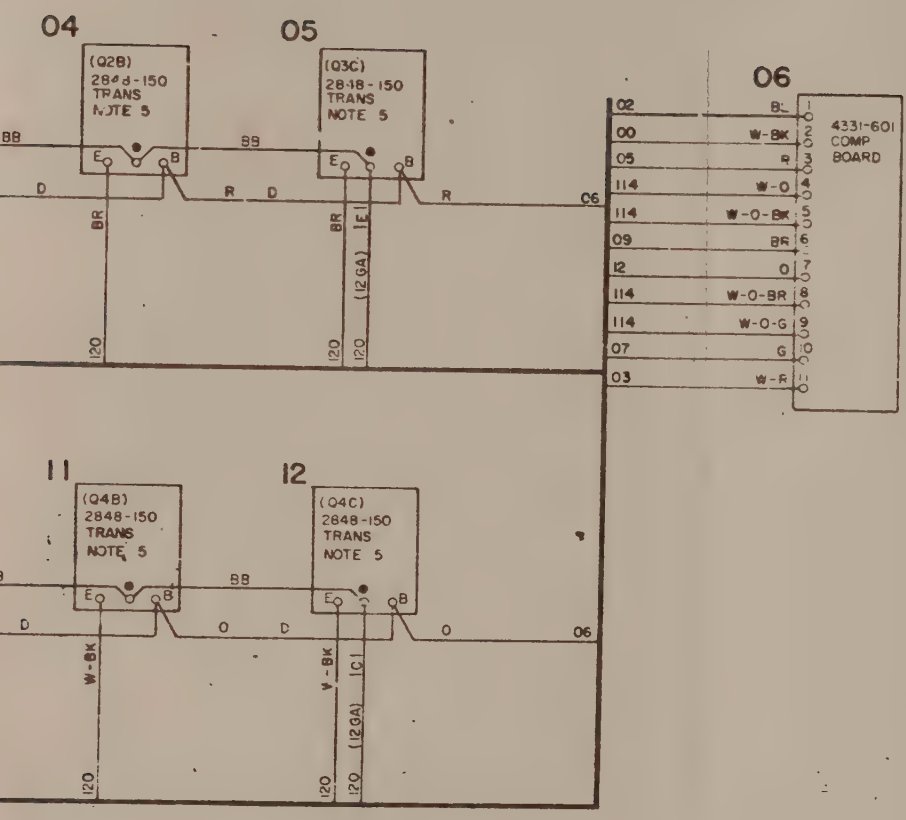


WIRING DIAGRAM
FOR
MODEL R83L

T-5686-004

TRANSISTOR AND HEAT SINK ASSEMBL
4872-401

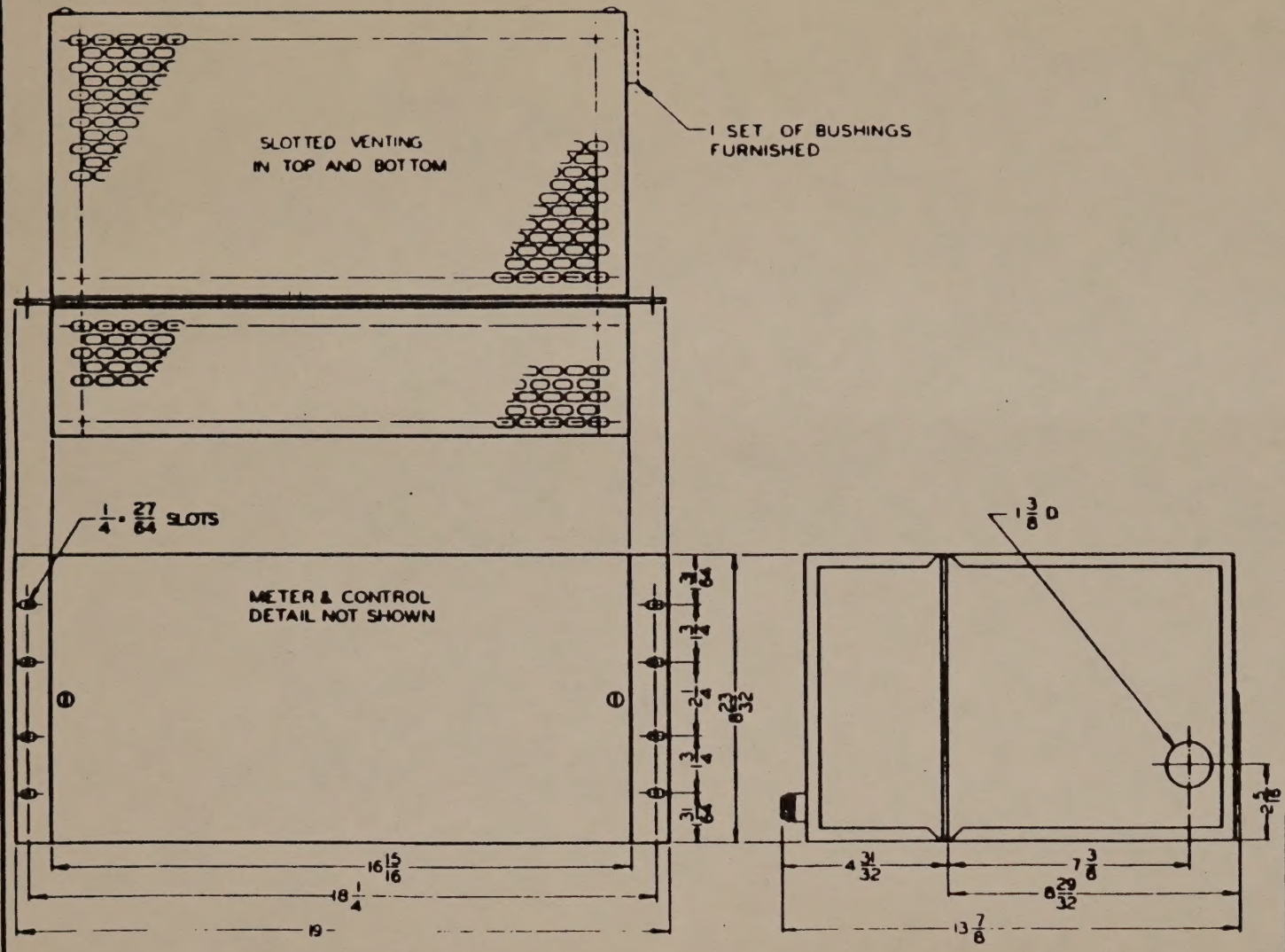




WIRING DIAGRAM
FOR
MODEL RB3L

T-5686-004

ED-722-20

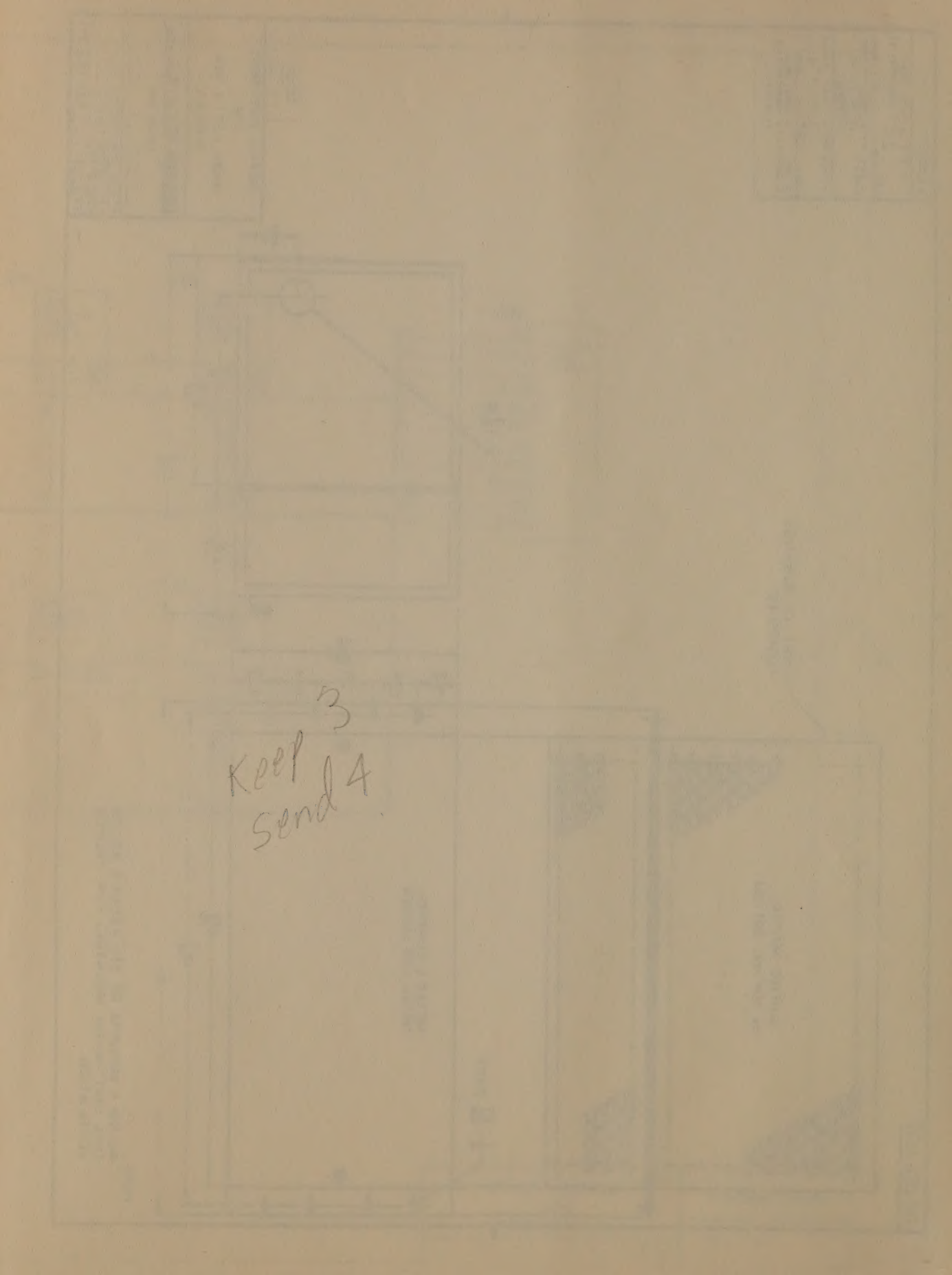


NOTE
ALLOW A MINIMUM OF 3½" ABOVE & BELOW THIS UNIT WHEN MOUNTING, FOR PROPER VENTILATION

OVERALL DIMENSIONS
FOR
MODEL CST3 & RB3L
SUPPLIES

LORAIN Products Corporation
LORAIN OHIO

ED-722-20


3
Keep
Send 4

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